Geometry in the industrial revolution was conected both to algebra, through the relationships

codified under the term analytic geometry, and to calculus, through the application of infinites . But there was also considerable interest in the continuing problem of Euclid’s parallel postulate.

One of the important geometry texts of the eighteenth century, Clairaut’s Elements of Geometry of 1741,

Clairaut’s natural approach began with the concept of the measurement of length by use of a

known measure. Because the straight line is the shortest distance from one point to another, the

distance between two points is measured by the length of the straight line connecting them. To

measure the distance from a pointC to a line AB, one simply realizes that the shortest such line

“leans” neither toward A nor toward B and is therefore the perpendicular from C to AB. To

determine this line, however, one needed a method of constructing a perpendicular. Clairaut

thus presented one, using a compass. Given now the notion of a perpendicular, Clairaut could

define a rectangle, a four-sided figure with each side perpendicular to the adjoining ones, and

a square, a rectangle with four equal sides. Clairaut also gave a “natural” definition of parallel

lines as lines such that the distance between them is always the same.

Clairaut showed that the

area of a rectangle is a product of the measures of the length and width and, since a triangle

is always half of a rectangle, that the area of a triangle is half the product of its base and

altitude. Because fields do not always have straight sides, however, Clairaut noted that one

could measure these by approximating the curved sides by segments of straight lines, then dividing the region into triangles, and measuring each of these. One can always approximate closely enough so that “all sensible error is eliminated.”

And also Clairaut noted that geometers did not want to measure by approximation the area of regions bounded by curves as he had suggested. It is more “rigorous” to measure such regions directly if possible. The only such figure he dealt with in this manner, however, was the circle, where

he showed that the area is equal to the product of the circumference and half the radius.

The eighteenth century saw renewed interest in the attempt to derive “rigorously” Euclid’s parallel postulate from the remaining axioms and postulates and thus show that it was unnecessary for Euclid to have assumed his non-self-evident fifth postulate. Among those who wrote on this subject were Girolamo Saccheri (1667–1733) and Johann Lambert

Another one

Britain, especially during the later eighteenth century, fought a

losing battle to restore Euclid’s Elements to its once glorious position, but

the British had done little to advance research in the subject. Through the efforts of Monge and Carnot, there were some stirrings of revival in pure geometry during the period of the French Revolution, but the almost explosive rediscovery of geometry as a living branch of mathematics came

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chiefly with the dawn of the nineteenth century.